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WHY SYNTAX MATTERS

ABSTRACT

Work on Hebrew word formation often emphasizes its morphological and phonological aspects. In this paper I argue that even with regard to processes that seem, *prima facie*, purely phonological or morphological, syntactic information should be taken into consideration. This claim is illustrated in the context of the discussion of two case studies : Bat El's (1994) treatment of Hebrew denominal verbs (an analysis extended by Bat El to all Hebrew verbs) and Aronoff's (1994) discussion of verbal patterns (binyanim), which grants special status to passive binyan forms. In the first case it is shown that once we look into the syntax of denominal verbs, it becomes clear that they are structurally different from other, root-derived verbs, and therefore their analysis should not be extended to all verbs. In the second case, the special status of passive forms follows immediately from the syntactic structure of passive verbs, and thus does not have to be stipulated arbitrarily.

KEYWORDS

Roots, binyan, word-formation, syntax, Hebrew.

1. Introduction

Word formation is determined by various factors, phonological, morphological, syntactic and semantic. What sets Semitic word formation apart from other systems is the fact that the various processes involved culminate in the mapping of a root onto one of a series of verbal or nominal patterns (known as *binyanim* and *mi? qalim*, respectively). Thus, there is an extra morpho-phonological requirement on the shape of the Hebrew verb, as illustrated in (1) [1]:

(1)	Root	verbal pattern	verb (3rd person sg. past) [2]
a.	√šbr	CaCaC	šavar (break)
b.	√šbr	niCCaC	nišbar (break-passive)
c.	√qpl	CiCCeC	qipel (fold)
d.	√qpl	CuCCaC	qupal (fold-passive)
e.	√ʕmd	hiCCiC	heʕemid (make stand)
f.	√ʕmd	huCCaC	huʕamad (make stand-passive)
g.	√qpl	hitCaCCeC	hitqapel (fold-intransitive)

The pattern illustrated in (1) clearly brings together three different areas of grammar. Phonology is involved because the characteristic prosodic properties of each binyan determine the phonetic shape of the verb stem. Morphology is involved by virtue of the existence of a set of seven possible verbal classes. And syntax is involved because binyanim interact with syntactic properties of verbs in a number of ways. For instance, even from the very limited set of data in (1) it is clear that the relation between two verbs created from the same root in two different binyanim may be that of a well-known syntactic alternation, such as active and passive or causative and non-causative. In point of fact, one is allowed to draw even some wider generalizations: for instance, it is a well known observation (see Berman 1978) that the mapping of a root onto binyanim niCCaC and hitCaCCeC never leads to the derivation of transitive verbs.

The nature of the interaction between syntax, morphology and phonology is a matter of much debate. Indeed, the characteristically Semitic feature of verb formation illustrated in (1) might suggest that at least some of the processes involved are of a strictly phonological or morphological nature. This view is proposed in McCarthy's (1981) seminal paper. In this paper, I propose the strongest possible thesis with respect to the role of the syntactic component: syntactic information is relevant throughout, even in connection with operations that, prima facie, might appear as pertaining exclusively to phonology or morphology. This thesis will be defended against the background of the discussion in two previous studies, Bat El (1994) and Aronoff (1994).

2. Syntax meets phonology: Stem modification and the formation of denominal and borrowed verbs

Consider, first, Bat El's seminal paper, regarding the phonological form of borrowed and denominal verbs. Bat El convincingly shows that these verbs are formed by a process called Stem Modification rather than (as originally assumed by McCarthy (1981)) the process of root to template association. Having established this analysis to this particular sub-group, Bat El extends the Stem Modification treatment to all Hebrew verbs, achieving a unified account of the Hebrew verbal system, with the notion of the consonantal root made redundant.

I agree with the first part of Bat El's work. There is indeed very good evidence that borrowed and denominal verbs are formed by modification from existing words rather than by root to template association. However, as will be illustrated here, there exists an important difference between the class of denominal and borrowed verbs, on the one hand, and all other Hebrew verbs, on the other hand. This difference may not be evident until we take into account the semantic and syntactic properties of denominal and borrowed verbs.

2.1. Stem Modification analysis – the evidence

Consider, first, the evidence in Bat El (1994) in favor of the stem modification analysis for borrowed and denominals verbs.

Many Hebrew nouns appear in the form of a prefixed nominal pattern. Bat El notes that verbs created from such nouns carry those affixes that are typical of nouns, such as *m-* and *t-*. As such affixes do not arise directly from any verbal template, this indicates that these verbs are indeed derived from the corresponding nouns, and not from an (abstract) root: [3]

(2)	Root	Related words	Base noun	derived verb
a.	√xzr	xazara (rehearsal)	**m**axzor (cycle)	**m**ixzer (recycle)
b.	√sxr	soxer (merchant)	**m**isxar (commerce)	**m**isxer (commercialize)
c.	√xzq	xozeq (strength)	**t**axzuqa (maintenance)	**t**ixzeq (maintain)
d.	√pqd	paqid (clerk)	**t**afqid (job, function)	**t**ifqed (function)

Second, Bat El notes that cluster transfer in borrowed verbs preserves the original consonant cluster of the word from which they are derived. This singles out borrowed verbs, since otherwise the same Hebrew verb may often appear with different consonant clusters (*e.g.* binyan 3 šiber vs. binyan 2 nišbar). As is evident from (3), however, the arrangement of the consonants in the case of borrowed verbs is much less free, and displays a tendency to preserve the original internal clustering of the base (underscored in (3)):

(3)	Base	Pattern	Derived verb
a.	*tran<u>sf</u>er* (transfer)	CiCCeC	*trin<u>sf</u>er* (to transfer)
b.	*strep<u>t</u>iz* (striptease)	CiCCeC	*strip<u>t</u>ez* (to perform a striptease)
c.	*si<u>nxr</u>oni* (synchronic)	CiCCeC	*si<u>nxr</u>en* (synchronize)

Note that the representation of clusters is not due to phonological restrictions: Hebrew phonology would allow forms such as '**tirnsfer*', '**stirptez*' or '**snixren*', where the cluster is broken. Thus the only remaining account is that there is a strong tendency *per se* for the noun-derived verb to preserve the form of the stem.

A similar preservation effect exists with regard to the selection of binyan itself. Bat El shows that borrowed and denominal verbs strongly tend to appear in the verbal pattern in which the phonological structure of the base word is best preserved. For example, when the base word has the vowel *i* in it, the verb will appear in the fifth pattern, which has the vowel melody *i/i* in the active voice:

(4)	Base	Derived verb
a.	*qliq* (a click)	*hiqliq* (to click)
b.	*fliq* (a slap)	*hifliq* (to slap)
c.	*špritz* (a splash)	*hišpritz* (to splash)

More strongly, Bat El (1994) and Ussishkin (1999) show that when the base noun is monosyllabic, thus requiring some modification to make the base fit into the prosodic structure of the verbal pattern, the form of the denominal verb is predictable from the form of the nominal base. That is, bases containing the vowel *o* such as *xoq* (law) and *qod* (code) give rise to verbs with the less frequent vowel melody {*o*, *e*}: *xoqeq* (legislate) and *qoded* (codify). Other short bases, by contrast, give rise to verbs containing the more common vowel melody, {*i*, *e*}, for example, *dam* (blood) creates *dimem* (bleed), *faks* (fax) creates *fikses* (fax) and *čat* (chat) creates *čitet* (chat).

Based on this evidence, Bat El argues that borrowed and denominal verbs are formed by a process called Stem Modification (that is, replacing the vowels of the base word by those vowels typical of the verbal pattern) rather than by root to template association, as originally assumed in McCarthy (1981). In other words: in the case of borrowed and denominal verbs the verb is formed not from a series of consonants, but from a fully formed phonological string.

Having established the Stem modification analysis for borrowed and denominal verbs, Bat El then extends this analysis to all Hebrew verbs. This step seems reasonable: instead of two different systems, Stem Modification for borrowed and denominal verbs and root to template association for other verbs, we have a unified account of the mechanism that is involved in Hebrew verb formation.

It is of course theoretically desirable to have a unified analysis – but, I would argue, unity should not be our goal at any price: what if denominal and borrowed verbs do form a separate category, different from other verbs in an important way? In this case, having a separate account for them would be, in fact, theoretically *desirable*. I argue that this is indeed the case. As will be illustrated in the following section, denominals and borrowed verbs differ from all other Hebrew verbs: semantically, syntactically as well as phonologically.

2.2. Why denominal and borrowed verbs are different

Bat El (1994) is interested in the phonology of the Hebrew verb as such and, indeed, there is no prima facie reason why one should not extend the treatment of denominal and borrowed verbs to all other verbs, especially since traditional grammar, in turn, did not assume any deep divide separating these two groups of verbs.

Yet the issue involves more than just the phonological mechanisms of Hebrew. The theoretical issue at stake is the status of the (consonantal) root, that is of a prime example of roots in general. Traditionally, Hebrew verbs are characterized as containing a tri-consonantal root, which serves as the lexical and phonological core of the verb. Once the root is mapped onto a verbal pattern, or *binyan*, it becomes an actual Hebrew verb:

(5)	Root	binyan	verb
a.	√šmr	CaCaC	šamar (guard)
b.	√pzr	CiCCeC	pizer (scatter)
c.	√psq	hiCCiC	hifsiq (stop)

Within such a traditional account, borrowed and denominal verbs do indeed appear to differ from root-derived verbs, since they are derived not from a *root*, but from an existing *word*. Borrowed verbs are mostly derived from a borrowed noun (6a-b), while denominals are derived from an existing Hebrew noun (6c-d):

(6)	Base word	derived verb
a.	telefon (telephone)	tilfen (telephone)
b.	qliq (click)	hiqliq (click)
c.	misgeret (frame)	misger (to frame)
d.	taxzuka (maintenance)	tixzek (maintain)

Note that under the traditional account, a principled distinction is drawn between root-derived verbs on the one hand and word-derived verbs (both denominals and borrowed verbs) on the other hand. Under a unified view such as the one advocated by Bat El, this principled distinction disappears.

It remains an empirical question, then, whether there are indeed any systematic differences between the two types of verbs to motivate a theoretical distinction between them. I now bring forward such evidence, which ultimately supports the traditional account.

This evidence is drawn from the semantics of the root. Note, first, that to the extent that we countenance the existence of the root, we must assume a somewhat different semantics for roots than for words. Roots — unlike fully-fledged words — are no more than cores, or potentialities. By being embedded in different nominal and verbal environments, roots can then create numerous nouns and verbs. Consider, for example, the root √xšb and the words it forms part of[4]:

(7) √xšb

a.	CaCaC (v)	*xašav*	(to think)
b.	CiCCeC (v)	*xišev*	(to calculate)
c.	hiCCiC (v)	*hexšiv*	(to consider)
d.	hitCaCCeC (v)	*hitxašev*	(to be considerate)
e.	maCCeC (n)	*maxšev*	(a computer / calculator)
f.	maCCaCa (n)	*maxšava*	(a thought)
g.	CCiCut (n)	*xašivut*	(importance)
h.	CiCCon (n)	*xešbon*	(arithmetic / bill)
i.	taCCiC (n)	*taxšiv*	(calculus)

All the words created by the root √xšb share the semantic and phonological core of the root. They contain the root consonants – x.š.b. – and they all share a common semantic core, related to a mental activity. However, this core can be incarnated in different environments in many different ways. In three different verbal environments the root may create three different verbs, each related to a mental activity or mental state: *xašav* (think), *xišev* (calculate) and *hexšiv* (consider). In nominal environments, the root creates nouns that refer either to a process of mental activity (*e.g. maxšava*, thought) or to an instrument related to a mental activity (*e.g. maxšev*, computer). This phenomenon is characteristic of Hebrew word formation. A single root often creates numerous nouns and verbs, whose meanings may be semantically far apart from one another, while all share some core meaning given by the root.

The phenomenon noted above was presented in terms of the theory of word-formation from roots. But nothing so far relies on the assumption of the existence of roots and, in fact, we can begin to discern here the prima facie argument for the root's existence. The surface phenomenon (bracketing away any strong theoretical assumptions) is that of clusters of words sharing both some phonology and some semantics. This phenomenon can accounted for in many possible ways, but it is certainly straightforwardly explained if we assume that the group of related words are derived from a common root. This root is then seen to be semantically and phonologically underspecified. It gets its semantic and phonological incarnations only when embedded in certain nominal and verbal environments, spelled out as verbal and nominal patterns in Hebrew. Viewed this way, the shared phonology and the semantic relatedness of each group of words are due to a principled reason: their phonological and semantic properties are limited by the common root from which they are formed. The fact that the meanings of the words in each group may be semantically far apart is then easily accounted for by the assumption that roots are to a large extent underspecified – and therefore may be assigned many different interpretations (all of which retain the core of the root).

Note that, in principle, there could be a Hebrew lexicon that makes no reference to roots. Word belonging to the same semantic domain but which are not derivationally related, could be listed in the Hebrew lexicon as separate lexemes: /xašav/, /xišev/, /taxšiv/, etc. When a word is clearly semantically derived from

one another through suffixes, for example, *taxšiv* (calculus) and *taxšivi* (related to calculus), lexical rules then relate words that without making reference to a common root.

But this way we lose the ability to account for cases where the meanings of two words are obviously related, yet *impossible* to characterize by a lexical rule. For example, both *xašav* (think) and *xišev* (calculate) retain the phonological core √xšb and the semantic core of "mental activity" – but there is no lexical rule that relates one to the other. All the words in (7) share strikingly little with one another – yet they all relate to the same semantic domain. Representing them as separate lexemes will fail to capture this fact. The root hypothesis elegantly accounts for such cases. If we assume no root, it remains a coincidence that the two words share both a phonological core (same consonants) and a semantic core (related meanings); while, if we assume lexeme formation, we end up with expectations of semantic relatedness that are far too strong. Word-formation from roots appears to be the most direct way to account for the evidence.

We are now in a position to show how the semantic evidence concerning Hebrew word formation from roots serves to distinguish borrowed and denominal verbs from all other verbs.

The ability to take on multiple interpretations in different verbal and nominal environments is strictly reserved for what is traditionally taken to be derivation from *roots*. Noun-derived verbs do not have the elasticity Hebrew word formation displays elsewhere: they must share an interpretation with the noun from which they are derived.

To illustrate this claim, consider the interpretations assigned to the root √sgr in various verbal and nominal environments:

(8) √sgr

a.	CaCaC (v)	*sagar*	(v, close)
b.	hiCCiC (v)	*hisgir*	(v, extradite)
c.	hitCaCCeC (v)	*histager*	(v, cocoon oneself) [5]
d.	CeCeC (n)	*seger*	(n, closure)
e.	CoCCayim (n)	*sograyim*	(n, parentheses)
f.	miCCeCet (n)	*misgeret*	(n, frame)

The root √sgr refers to a semantic core of "closedness" or "restrictedness", which is shared by all the nouns and verbs derived from it. One of these nouns, *misgeret* (frame, 8f), further creates a new Hebrew verb, *misger* (to frame):

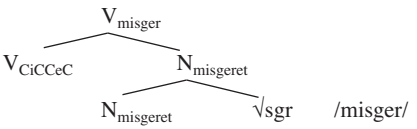
(9)	a.	miCCeCet	*misgeret*	(a frame)
	b.	CiCCeC	*misger*	(to frame)

Consider the relation between the noun *misgeret* (frame) and the verb derived from it. The verb bears a morpho-phonological similarity to the noun: it contains not only the root consonants, s.g.r., but also the prefix *m-*, which is carried over from the nominal pattern (miCCeCet) into the verbal form. The presence of this prefix overtly indicates the nominal origin of this verb. The vowels of the verb,

on the other hand, are those typical of the verbal pattern CiCCeC, not of the nominal pattern in which the noun appears[6]. I assume that the formation of the verb *misger* (to frame) is as follows: first, the consonants of the root √sgr are combined with the noun-creating morpheme, morphologically spelled out as miCCeCet (10a). The noun *misgeret* (frame) is then embedded under a v head (10b). With Bat El, I assume that the phonological realization of this process involves melodic overwriting, that is, matching the vowels of the stem with those of the third pattern, CiCCeC:

(10) a. Root-derived noun:

b. Noun-derived verb:



But noun-derived verbs differ from root-derived verbs not only morphologically, but also semantically. It may seem natural or even trivial that the verb made from the noun *frame* means *to frame*. But this, I argue, is a crucial property of noun-derived verbs. While root-derived verbs may pick up numerous interpretations in different environments, noun-derived verbs are tied to the meaning of the noun from which they are derived. To illustrate this point, compare the root √sgr in (8) with the noun *misgeret* (frame) in (9). The root √sgr is assigned numerous interpretations in different environments, but when the basis for the derivation is not the root √sgr itself but a noun derived from it (*misgeret*), that noun seems to force its meaning on any element further derived from it. Although the verb *misger* contains the consonants of the root √sgr, it cannot have access to the underspecified core meaning of the root, or to all the interpretations assigned to that root in different environments: something seems to interfere between the verb *misger* and the root √sgr. This interfering element, I argue, is the noun *misgeret*.

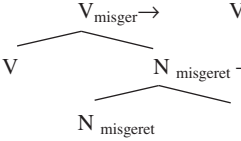
Why should the presence of the nominal projection interfere between the root below it and the verb above it, not allowing the verb any access to the root? I argue that this is entailed by a locality principle that constrains the possible interpretations assigned to roots in different environments. Specifically, following Marantz (2000), I postulate the following:

(11) Locality constraint on the interpretation of roots: roots are assigned an interpretation in the environment of the first category-assigning head with which they are merged. Once this interpretation is assigned, it is carried along throughout the derivation.

The generalization stated in (11) seems to be correct – and we could leave it at that. It would be theoretically desirable, however, to derive this principle from an independently motivated, general locality principle. What (11) argues is that the first category head that merges with the root defines a closed domain for interpretation. Cyclicity and closed domains play an important role in most areas of generative grammar – phonology, morphology and syntax. The locality constraint in (11) could thus be formulated in a number of ways: it could be stated structurally, though in the lexical component, as a condition governing complex words; it could be formulated as a purely lexical rule, postulating different levels in the lexicon. However, there are some advantages to postulating this locality condition as a *syntactic* condition: a condition on merging basic lexical elements, such as roots and category features[7]. Such an account requires no further assumptions – the locality constraint on roots follows immediately from the independent syntactic notion of cyclicity. Let us consider how this is done.

If we follow the line of argumentation suggested in Marantz (2000), then the first category head merging with the root defines a *phase* (*cf.* Chomsky 1999), that is, a stage in the derivation where the element built by the computational system is spelled out both semantically and phonologically[8]. The locality constraint in (11) then immediately falls out of the definition of the phase. Once the root has merged with the first category head, the product of the computation is sent off to the interface levels. The interpretation of the output (noun, verb or adjective) in that environment is then fixed both semantically and phonologically. Whatever comes next in the course of the derivation will not merge directly with the root: it will combine with an element whose features have already been shipped to and interpreted at LF, being assigned there an interpretation in their specific context. Since the phase is a closed domain, any material above it cannot have any access to what is inside. As a result, further derivational elements cannot alter the interpretation assigned to a root in the environment of a verbal or nominal head, nor can it have any access to the root itself. The only alterations may be those modifications forced by the additional heads. For example, adding a v head to the noun *misgeret* (frame) changes its category, yielding a verb. Since the verb *misger* (to frame) is created from a noun, it cannot "look back" into the closed domain defined by the nominal head. Crucially, the verb cannot access the underspecified core meaning of the root, and take on any of the numerous interpretations assigned to the root √sgr (*cf.* 9 above). Instead, it is tied to the particular instantiation of the root √sgr in the nominal environment of miCCeCet. That is, to the noun *misgeret* (frame) from which it is derived:

(12)



V merges with the noun *misgeret* (frame), and has no access to √sgr
first category head N defines a phase.
Interpretation is assigned to the noun at LF
√sgr

The locality above, as well as the phase hypothesis, are strongly supported by the Hebrew data. In all cases of noun-derived verbs attested, the verbs are tied to their base nouns and have no access to the root. Two more cases (out of many) may serve to illustrate this[9]:

(13) √xzq

a. CaCaC	*xazaq*	(adj., strong)
b. CiCCeC	*xizeq*	(v, to strengthen)
c. hiCCiC	*hexziq*	(v, to hold)
d. CiCCa	*xezqa*	(n, in math: power)
e. CCaCa	*xazaqa*	(n, a hold, custody)
f. CoCeC	*xozeq*	(n, strength)
g. taCCuCa	***t**axzuqa*	(n, maintenance)
h. CiCCeC	***t**ixzeq*	(v, to maintain, from *taxzuqa*, maintenance)

One of the nouns derived from √xzq, *taxzuqa* (maintenance), further creates the verb, *tixzeq* (maintain). This verb retains the nominal prefix *t-* and is tied semantically to the noun from which it is derived: while the root √xzq creates words with varied meanings, the noun, *taxzuqa,* (maintenance) can only form a verb whose meaning is *maintain*. Access to the various meanings associated with the root √xzq is barred once the noun-creating head has merged with the root and fixed its specific interpretation in that environment. Finally, consider the root √xšb:

(14) √xšb

a. CaCaC	*xašav*	(think)
b. CiCCeC	*xišev*	(calculate)
c. hiCCiC	*hexšiv*	(consider)
d. hitCaCCeC	*hitxašev*	(be considerate)
e. taCCiC	*taxšiv*	(calculus)
f. maCCaCa	*maxšava*	(thought)
g. maCCeC	***m**axšev*	(computer)
h. CiCCeC	***m**ixšev*	(computerize, from *maxšev*, computer)
i. CiCCon	*xešbo**n***	(account, arithmetic, calculation, bill)
j. hitCaCCeC	*hitxašbe**n***	(settle accounts with someone, from *xešbon*, account)

The root √xšb forms various nouns and verbs. But the verbs *mixšev* (14h, note the nominal prefix *m-*) and *hitxašben* (14j, note the nominal suffix, *-n*), derived respectively from the nouns *maxšev* (14g) and *xešbon* (14i), depend in their interpretation on their base noun.

Borrowed verbs, almost trivially, behave in this respect exactly like denominal verbs. Borrowed verbs are either borrowed as *verbs* – hence the language has no access to the root (as in the case of *hiqliq*, to click) – or derived from borrowed nouns (as in *tilfen*, telephone), in which case they are a special case of denominals. Consider Hebrew verbs that are derived from foreign words:

(15) a. foreign noun: *telephone*
b. borrowed Hebrew noun: *telefon*
c. borrowed verb: *tilfen*, CiCCeC (to telephone)

(16) a. foreign verb: *click*
b. borrowed verb: *hiqliq*, hiCCiC (to click)

Borrowed verbs or nouns are semantically tied to the foreign word, and thus only very rarely change their basic meaning in the act of borrowing[10]. I take this as evidence that the borrowed element is not a root, but a noun or a verb, that is, a unit whose lexical and semantic properties have already been sent off to PF and LF.

A strong prediction suggests itself: if the phase hypothesis is correct, then noun-derived and root-derived verbs are not formed by the same phonological mechanism. When a verb is derived from a noun, the phonology has no access to the root, only to the stem. That is, noun-derived verbs are predicted to be formed by Stem Modification. A further prediction follows: not only should denominal verbs resemble their base nouns phonologically, but also, root-derived verbs may have phonological peculiarities, similarly to their semantic peculiarities. Such phonological peculiarities should not occur with denominal verbs, which have no access to the root consonants. As will be shown in section 2.3, both predictions are indeed borne out.

2.3. Back to phonology

Let us now go back to Bat El (1994). I argue that we must not extend the Stem Modification analysis from word-derived verbs to all Hebrew verbs, precisely because of the property that characterizes these verbs – their being made from existing words. When a verb is formed from a foreign word, *e.g. telephone*, or from a root-derived noun, *e.g. misgeret* (frame), the interpretive component has access only to the meaning of the *noun*; and the phonological component has access only to the phonology of the *noun*. We thus *expect* that borrowed and denominal verbs be formed by Stem Modification of the noun rather than by root to template association. This is the only choice the grammar has: it cannot extract the consonants of the root, to which it has no access; all it has is the existing stem. All the phonological properties of denominals noted by Bat El – preservation of clusters, preservation of the base word, nominal morphology carried into the verb (resulting, according to Bat El, from the requirement that all the consonants of the base be syllabified) – fall out from our theoretical account. And this is also where these verbs differ from root-derived verbs.

The root, recall, is not an actual (semantic or phonological) word. It has been shown here that the root-derived words may have semantically idiosyncratic interpretations in different environments – idiosyncrasies that do not exist in word-derived words. If what I argued so far is on the right track, then we expect that root-derived words will have not only semantic idiosyncrasies, but also

phonological idiosyncrasies. By contrast, we expect that word-derived verbs will not exhibit such phonological idiosyncrasies.

In what follows, we shall see that certain Hebrew verbs exhibit phonological peculiarities, while others do not. Strikingly, the verbs of the first group are precisely those that are traditionally taken to be root derived, while those in the second group are those known to be derived from an existing word. Consider, first, assimilation of *n*, which was noted in section one above. When *n* is part of the root, it assimilates before stops and coronal fricatives and affricates:

(17) a. √npl → nafal (CaCaC, fall), hipil (hiCCiC, drop; *cf.* *hinpil)
b. √ngʃ → nagaʃ (CaCaC, touch-past), yigaʃ (touch-future; *cf.**yingaʃ), higiʃa (hiCCiC, reach; *hingiʃa)
c. √nšq → našaq (CaCaC, touch on), hišiq (be tangential, hiCCiC, *hinšiq)

We thus get *našaq* in (17c), when the root consonant precedes a vowel (CaCaC), but *hišiq*, rather than **hinšiq*, when the root consonant precedes another consonant (hiCCiC)[11]. Let us now compare these verbs to verbs made from nouns that happen to contain the consonant *n* in them. In such cases *n* does not assimilate. The verb retains the phonological form of the noun it is derived from (modulo the phonological changes required for making the base fit into the verbal pattern, such as stem modification and melodic overwriting):

(18)	Base noun	derived verb
a.	neged (opposite)	hingid (put in opposition, hiCCiC, *cf.**higid)
b.	necax (eternity)	hinciax (eternalize, hiCCiC, *cf.* *hiciax)[12]
c.	nevet (sprout)	hinbit (sprout, hiCCiC, *cf.* *hibit)

From *neged*, opposite, in (18a), a verb, *hingid*, put in opposition, is derived. When put into the verbal pattern, *n* directly precedes the stop *g*, but this *n* does not assimilate. The consonants of the base noun, *neged*, are unaffected. The difference between the two groups is even more manifest when we compare minimal pairs of (allegedly) root-derived and noun-derived verbs:

(19)	Root-derived (assimilation)	Noun-derived (no assimilation)
a.	higiʃa (reach, √ngʃ)	hingid (put in opposition, *neged*, opposition)
b.	hicil (save, √ncl)	hinciax (eternalize, *necax*, eternity)
c.	hibit (look, √nbt)	hinbit (sprout, from *nevet*, sprout)

The contrast is clear: when *n* is part of the abstract root, it assimilates in well-defined phonological environments. When the noun that serves as the basis for the derivation happens to contain *n*, this consonant is not affected, regardless of the phonological environment in which it appears.

Another Hebrew phonological process, briefly noted above, is spirantization of *b*, *k* and *p* in post-vocalic positions, yielding *v*, *x* and *f*, respectively. This process takes place precisely in those verbs that are traditionally taken to be root-derived[13]:

(20) a. √šbr → ša**v**ar (CaCaC, break), niš**b**ar (niCCaC, break passive)
b. √ktb → **k**atav (CaCaC, write-past), yi**x**tov (yiCCoC, write-future)
c. √pxd → **p**axad (CaCaC, fear), hi**f**xid (hiCCiC, frighten)

In noun-derived verbs, on the other hand, no spirantization alternation occurs. The form of the consonant present in the noun is retained in the verb:

(21)	Base noun	derived verb
a.	xrop (snooze)	xarap (to snooze, CaCaC, *cf.* *xaraf)
b.	fašla (flop)	fišel (to flop, CiCCeC, *cf.* *pišel)
c.	telefon (telephone)	tilfen (to telephone, CiCCeC, *cf.* *tilpen)
d.	koxav (star)	kixev (to star, CiCCeC, *cf.* *kikev)

Although the phonology of Hebrew requires spirantization after a vowel, the verb derived from *xrop*, snooze, in (21a) is *xarap*, not **xaraf*. The mirror image of this phenomenon is in (21b): although in initial position no spirantization occurs, the verb derived from *fašla* is *fišel*, not **pišel*.

Roots containing middle glides (w/y) give rise to contracted verbal forms, as illustrated in (22) (note that *w* and *y* alternate):

(22) a. √qwm → qam (CaCaC, rise, *cf.* *qawam)
b. √kwn → hexin (hiCCiC, prepare, *cf.* *hixwin)
c. √xwl → xolel (CiCCeC, cause, make happen, *cf.* *xiwel)
d. √bws → boses (CiCCeC, mire in, *cf.* *biwes)

When a glide is present in a noun, it is preserved in the verbal form derived from that noun, and no contracted form occurs:

(23)	Base noun	derived verb
a.	xayal (soldier)	xiyel (conscript, CiCCeC, *cf.* *xolel)
b.	bayit (house)	biyet (domesticate, CiCCeC, *cf.* *botet)
c.	šuq (market)	šiveq (market, CiCCeC, *cf.* *šoqeq)

A similar effect exists with roots that are traditionally taken to contain two final identical consonants, and which McCarthy (1981) analyses as bi-consonantal. Such roots give rise to special verbal forms:

(24) a. √sbb → sovev (CiCCeC, turn around, *cf.* *sibev)
b. √sbb → hesev (hiCCiC, turn, *cf.* *hisbiv)
c. √prr → porer (CiCCeC, crumble, *cf.* *pirer)
d. √prr → hefer (hiCCiC, violate, *cf.* *hifrir)
e. √dmm → domem (CiCCeC, silence, *cf.* *dimem)

When a verb is formed from a noun that contains two identical consonants, or when reduplication of one consonant takes place in order to make a monosyllabic noun fit into a bisyllabic pattern, the verb does not give rise to such special forms:

(25)

Base noun / adjective	derived verb
dam (blood)	dimem (bleed, CiCCeC, *cf.* *domem)
basis (basis)	bises (base, CiCCeC, *cf.* *boses)
xam (hot)	ximem (heat, CiCCeC, *cf.* *xomem)

When we compare minimal pairs, made from roots or from nouns, the contrast is particularly evident:

(26)

Root-derived:	Noun-derived:
a. domem (silence, √dmm)	dimem (bleed, *dam*, blood)
b. boses (mire in…, √bss)	bises (base, *basis*, basis)

If the underlying root is biconsonantal (√bs), it gives rise to a verb of a special form (*boses*). Yet verbs formed not from roots, but from nouns containing two identical consonants (*basis*) do not have special forms (*bises*).

A caveat should be made at this point. The phonological distinctions made here do not divide root-derived from word-derived verbs in the sense that certain mutations *must* occur with root-derived verbs while never occurring with word-derived verbs. Mutations may fail to occur even with root-derived verbs. For example, some root-derived verbs also keep their middle glides. In the third pattern, many of them have two forms, one that drops the middle glide and one that retains it[14]. In addition, certain phonological changes, such as metathesis of t with *s*,*š* and *c* in the hitCaCCeC pattern and changes in the final syllable when the final consonant is *h* occur both in root-derived and in word-derived verbs[15]. The division between root-derived and word-derived verbs is thus more subtle: it is one of possibility. Mutations of a certain kind are possible (though not necessary) with root-derived verbs; they are impossible with word-derived verbs.

The phonological state of affairs is in fact directly comparable to the semantic one. The division there is that root-derived forms very often display a wide semantic cluster, whereas word-derived forms must be tied semantically to the meaning of the word they are derived from. (Yet it is of course possible – and does happen occasionally – that the cluster of forms produced from a single root would be more compact, all of them being tied semantically to a single word.) Similarly, root-derived verbs *may* yield phonological idiosyncrasies, while word-derived verbs can only alter the lexical and phonological output of an already existing word, and therefore *can not* exhibit such idiosyncrasies.

Let us summarize the argument made here. The question raised was whether we may extend the stem modification analysis from denominal and borrowed verbs to all Hebrew verbs. Looking at the two groups of verbs, we discovered a semantic asymmetry between them: root-derived verbs may take up numerous interpretations, while noun-derived verbs must share the interpretation of the noun from which they are derived. I suggested a structural account for the asymmetry: the first verbal or nominal head that merges with a root defines a phase, or a close domain. Anything that merges above that level has no access to the root – only to the semantics and the phonology of the noun or verb. Viewed this way, it then follows that denominal verbs must be formed by Stem

Modification: the phonological component has no access to the root. But root-derived verbs work differently. They do not have a pronounceable stem, but a phonologically underspecified root. They are thus given their phonological incarnation in the environment of the verbal or nominal pattern. It is therefore predicted that root-derived verbs should exhibit phonological peculiarities, similar to their semantic peculiarities. In this section we saw that this is indeed the case.

While the Stem Modification analysis is indeed valid for denominal verbs, it was shown here that this analysis cannot be extended to all Hebrew verbs. We need two different phonological mechanisms, because the grammar – phonology included – treats roots and words differently. If we were to ignore the semantic and syntactic differences between root-derived and noun-derived verbs, we would never have found the meaning of the phonological differences between them. And so we find that even when the phenomenon in question is purely phonological – such as whether Stem Modification may account for all Hebrew verbs – semantic and syntactic information plays a crucial role.

3. Syntax meets morphology: Aronoff (1994)

In Bat-El's system, a class of verbs – borrowed and denominal – was treated similarly to other verbs. I argued that this blurs an important divide in Hebrew. By considering the syntactic properties of that class of verbs, one could see why indeed it should be seen as special.

In what follows I describe the analysis in Aronoff (1994), where a certain class of verbs – this time, passives – is taken to form a special case. This time, Aronoff does not make the suggestion that this class should be conflated with that of all other verbs. Instead, he allows passives to be treated separately from other verbs. However, this separate status is left unmotivated. In what follows I show how, even taking the terms of Aronoff's analysis itself, considerations of syntax can make the special status of passives follow naturally. This is significant, in particular, as Aronoff (1994)'s discussion of the Hebrew verbal system is part of a research program that advocates an autonomous status of morphology, independent of other grammatical components such as phonology and syntax.

In what follows I shall describe Aronoff's account in general, to provide a context for Aronoff's treatment of Hebrew passives.

Aronoff starts from the basic morphological question regarding Hebrew binyanim, namely, their status: derivational or inflectional? To begin with, binyanim behave in clearly marked derivational ways: they are neither transparent nor productive. They are obviously not transparent: as we have already noted above, the meaning of the root in a certain binyan is generally speaking unpredictable, and cannot be derived by any rule from the assumed meaning of the root or a combination of a root and the binyan (see also Berman 1978):

(27)	Root	CaCaC	CiCCeC	hiCCiC
a.	√xšb	*	xišev (calculate)	hexšiv (consider)
b.	√šmr	šamar (guard)	šimer (preserve)	*

Such examples are similar to what we have seen already in section 2.2 above: while the verbs formed with the same root do share a core of meaning, the semantics of 'calculate' and 'consider' (both derived from √xšb), or 'guard' and 'preserve' (both derived from √šmr) are not correlated in any predictable form.

Binyanim are not productive, as seen by the large number of gaps throughout the binyan system: in most cases there are several possible binyan forms that do not host actual verbs (attempts by Hebrew speakers to form words having such hypothetical forms would typically sound either jocular, or like a non-native mistake). Most roots appear in one or two binyanim at most, and only a few appear in four or five different binyanim:

(28)

Root	CaCaC	niCCaC	CiCCeC	hiCCiC	HitCaCCeC
√sdr	*	*	sider (arrange-transitive)	hisdir (coordinate)	histader (arrange-intransitive)
√zkr	zaxar (remember)	nizkar (come to remember)	*	hizkir (remind)	*
√xmm	*	*	ximem (heat-transitive)	*	hitxamem (heat-intransitive)
√lbš	lavaš (wear something)	nilbaš (be worn)	*	hilbiš (dress someone)	hitlabeš (get dressed)

At the same time, Aronoff argues that binyanim have the central property typical of inflectional morphology: their obligatoriness, namely, the fact that all Hebrew verbs must be in the form of a binyan. Any Hebrew verb, without exceptions, must take the form of a certain binyan prosody and vowel melody. Furthermore, binyanim have another property Aronoff associates with inflectional morphology: one specific form of the verb in a given binyan is sufficient to predict all the remaining forms of that verb in that binyan, so that from the 3rd person sg. of a verb in a given binyan one can also predict the 1st person pl., etc.[16].

By analogy with languages with noun classes (*e.g.* Russian), Aronoff suggests that binyanim are verbal inflectional classes. From this follows their obligatoriness – as should be the case given Aronoff's principle, that in languages with inflectional classes, each member of the relevant grammatical category must be assigned to an inflectional class[17]. Binyanim, that is Hebrew *verbal* patterns, thus stand in contrast to mišqalim, or Hebrew *nominal* patterns. Aronoff shows that mišqalim are not inflectional classes in the same way binyanim are. For once, mišqalim are not obligatory for all nouns, while binyanim are obligatory for all

verbs. (That is: many Hebrew nouns take one of many aberrant vowel melodies, which do not appear to belong to any well-known cluster of other Hebrew nouns; these are therefore taken to be formed independently of any mišqal.) In addition, while any single form of a verb determines the entire paradigm of that verb in all tenses and persons, it is impossible to predict the nominal paradigm, in particular, the plural form, in such a way. Thus, although the plural form of the mišqal is often predictable from the singular, this is not always the case:

(29)	nominal pattern (mišqal)	singular	plural
	a. maCCeC	maxbet (racket)	maxbetim
	b. maCCeC	mazleg (fork)	mazlegot
	c. CiCCoC	cipor (bird)	ciporim
	d. CiCCoC	kinor (violin)	kinorot
	e. CCaCa	nemala (ant)	nemalim
	f. CCaCa	sxava (rag)	sxavot

At this point arises the paradox: binyanim appear to be simultaneously derivational and inflectional. They are derivational because the distribution of roots in them is not paradigmatic, and their output is not semantically transparent. They are inflectional because they are obligatory for all verbs. Should we then drop the distinction – so useful throughout morphology – between the derivational and the inflectional?

Of course, this is not what Aronoff suggests. Instead, he argues that this is really not a paradox, since derivation and inflection are not two types of morphology, but, as he puts it, two *uses* of morphology: "inflection is the morphological realization of syntax, while derivation is the morphological realization of word formation" (Aronoff 1994 : 126). Most crucially, Aronoff assumes that the same morphology can realize both inflectional and derivational processes. This is the case of the binyan system, which he argues to be simultaneously derivational and inflectional.

The system works as follows. Abstract lexeme-formation rules assign their output verb stem a membership in some inflectional class (binyan). The inflectional class itself, that is, the binyan, determines the inflectional paradigm of that verb stem:

Lexeme-formation rules assign membership:		Binyanim determine paradigm, *e.g.*:	
		3rd sg. past	1st pl. past
√XYZ → binyan 1	→	XaYaZ	XaYaZnu
√UVW → binyan 3	→	UiVeW	UiVaWnu
√ABC → binyan 5	→	hiABiC	hiABaCnu

That is: one set of rules in the language, lexeme-formation rules, determines arbitrarily that √XYZ is assigned to binyan 1, √UVW – to binyan 3, and √ABC – to binyan 5; a separate set of rules, namely those of the inflectional classes, determine the specific forms of the verb from the binyan to which it was assigned.

The binyan system, according to Aronoff, thus has a dual role: "It serves as the abstract morphological mark of the lexeme formation rule and, as an inflectional class, it dictates the phonological form of the verb." (*Ibid*: 127.) Note that the lexeme formation rules are abstract. That is, the assignment of verbal lexemes to different inflectional classes has no direct overt phonological reflection. The only overt reflection is the full inflectional paradigm, which is determined by the binyan. Hebrew lexeme formation rules thus carry no morphology of their own – which is why the initial "paradox" regarding the binyan system arose in the first place[18]. Binyanim are thus similar in all respects to inflectional classes in other languages (*e.g.* Latin noun declensions).

It should be stressed that Aronoff represents the inflectional class, in this case the binyan, as an abstract function. The input of this function is a root (assigned to a binyan by lexeme-formation rules) and its output is a verb stem of a certain form, which can then be inflected according to the inflectional paradigm of Hebrew verbs:

(30) √root, lexeme-formation rules → binyan → inflectional paradigm

It is only the secondary effect of the binyan – where the language predicts consequences from the root's membership in an inflectional class – which has overt morphological manifestation. The binyan, in itself, carries no overt morphological marks. It is merely a tag used in morphological computation. Aronoff therefore rejects even McCarthy's (1981) claim that the binyan has some independent morphological content – a prosodic template: although most binyanim can be equated with their own prosodic templates, there are two binyanim – 1 (CaCaC) and 2 (niCCaC), which do not retain their prosodic templates throughout the paradigm. These binyanim have a specific template in the past tense (CVCVC for pattern 1 and CCVC for pattern 2) and another specific form in the future tense (CCVC for pattern 1, CVCVC for pattern 2). Therefore, a context-sensitive mapping rule is required in order to determine the prosodic form of the binyan. This suits Aronoff's abstract view of the binyan: the binyan in itself does not determine a template (onto which prefixes and suffixes may then be attached). Instead, the template itself would be determined by the interaction of the binyan and the precise verbal form, including tense, person etc.

Let us note then: in Aronoff's system, two different templates can be the output of a single binyan, dependent on the context; these two forms are not associated with each other derivationally, but are instead each derived separately from the root itself.

We can now finally come to discuss the case of Hebrew passives. The two exclusively Hebrew passive patterns (number 4 and 6) are now seen to stand out of the system in a radical way. They are not independent stem templates, but rather, are traditionally taken to be derived from another stem, in another binyan – in stark contrast to the behavior of verb formation within binyanim in the case of present and future in binyanim 1 and 2. The passive, by this traditional account, is formed by taking the template of binyan 3, transforming it in a given way so as

to obtain binyan 4; or by taking the template of binyan 5, transforming it, in the same way, so as to obtain binyan 6. Specifically, this is done through deletion of the stem vocalism and its replacement with the stem vowels characteristic of passives – *u* / *a*:

(31) active passive
a. š*i*m*e*r (preserve) š*u*m*a*r (preserve-passive)
b. h*i*st*i*r (hide) h*u*st*a*r (hide-passive)

It would certainly be undesirable to leave the relationship between binyanim 3 and 4, and 5 and 6, as an unexplained quirk of the system. The morphological forms themselves strongly suggest that the forms of binyanim 4 and 6 are indeed directly derived from their corresponding binyanim 3 and 5. While in Hebrew, perhaps, this might appear as (possibly) a coincidence, Arabic has the same phenomenon multiplied several times over: each of the active verbal templates (of which there are standardly taken to be 10) has associated with it a passive form, which is always identical to the active form with the difference that the passive vowel melody is always /u-i/. It is clearly preferable to have some principled account of the Semitic passive, then, where it is seen to depend on the active.

Now notice that, given the abstractness of the binyan within Aronoff's system, there is a problem in accommodating passives. For just what is the purely morphological information binyanim 4 and 6 have access to? Binyanim as such, for Aronoff, are mere tags, and do not carry a vowel melody with them. Even if the grammar may encode the information that binyan 4, say, is dependent upon binyan 3, this would not do for Aronoff's morphology, since the phonological spell-outs of different binyanim is, within Aronoff's morphological system, indepenent from each other. To acknowledge this, Aronoff has to move passives to a different domain from that of actives. Binyanim 4 and 6, he agrees, are the output not of morphological, but of syntactic rules. In other words: the process governing the formation of verbs in binyanim 1, 2, 3, 5, 7 is of a different order from that governing the formation of verbs in binyanim 4 and 6.

So far, then, Aronoff acknowledges a gap in the system. Regarding the nature of the gap – the actual syntactic process involved in passive formation, he claims that "For my purposes, the question is just not interesting" (*ibid.*: 134). Why passives – and no other form – should behave so differently from any other Hebrew verb is a question Aronoff simply cannot address by his own terms. Aronoff's system requires that the phonological spell-outs of binyanim would be independent from each other. Thus, in the case where the spell-outs clearly are dependent, Aronoff must acknowledge a gap in the system. However, this gap itself is left, by Aronoff, unaccounted for: it is just an unpleasant discontinuity in the behavior of Hebrew (or Semitic) verbs.

It would obviously be preferable to have an account explaining why passives ought to differ. This, in fact, can be done – as soon as we allow syntactic considerations into morphology.

This c an be seen as follows. Marantz (2000), based on the observation made in Arad (1999), shows that the choice of binyan for causative, inchoative or other types of verbs is, to a certain extent, up to the root. For instance, inchoative verbs can appear in any of the binyanim 1, 2, 5 or 7:

(32)

	Root	pattern	inchoative verb
a.	√qpʔ	1	qafaʔ (freeze)
b.	√mss	2	namas (melt)
c.	√chb	5	hichiv (become yellow)
d.	√xmm	7	hitxamem (become hot)

The interesting contrast is, once again, with passives, where no such choice is available. Passive morphology always depends on the active morphology:

(33)

active	passive
1	2
3	4
5	6

Here, there is no room for idiosyncracies of the root. No root may form an active verb in pattern 3 and its passive in pattern 6.

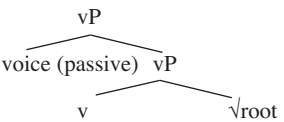
Marantz ascribes this difference to the structural difference between passives and other verbs. In causatives, inchoatives and other types of active verbs, the root in a local relation with the verbal head that merges with it:

(34)

Let us assume now – contra Aronoff – that the binyan is the spell-out of the verbal morpheme in Hebrew. Roots are then in a local configuration with the verbal head that merges with them. Since selection works locally, roots may select for its overt spell-out, namely, the binyan they appear in. The fact that causative and inchoative verbs may appear in different patterns is not surprising: these verbs are root derived, and selection of a pattern in up to the root.

Now consider passives. Following Kratzer (1996), Marantz assumes that passives involve a Voice head, which is responsible for the projection (or lack thereof) of the external argument, and which is located above the head v that verbalizes the root:

(35)



The voice head involved in passive formation merges with the vP; there is no local relation between the voice head and the root. The choice for binyan has already been made when the root has merged with the v head. Voice head merges

with a vP, namely, with an entity whose morphological form has already been determined. The voice head has no access to the root, and therefore the root cannot select a different passive morphology. Rather, the morphology of passives involves a modification of the already existing active morphology.

It follows that, if we take into consideration the syntactic structure of passives, it is predicted that passive morphology will be regular, while the morphology of non-passive verbs will be, to some extent, depending on idiosyncratic properties of the root. Syntax explains, finally, why active binyanim appear rather like arbitrary classes, while passive binyanim appear to be purely derived. Once again: by avoiding morphology by itself and, instead, taking the route of combining both syntax and morphology, we could motivate what otherwise would remain an arbitrary distinction within the Hebrew verbal system.

4. Summary

In this paper we examined two cases that seemed, prima facie, purely phonological or morphological: the purely phonological character of Hebrew verb formation as described by Bat-El (Bat El 1994) and the analysis of the stem template of the binyan (Aronoff 1994). In the case of phonology, the phonological considerations alone seemed to describe well the class composed of borrowed verbs and denominals. In the case of morphology, the morphological considerations alone seemed to describe well the class of non-passive verbs. Both accounts, however, did not come to terms with the fact that they dealt with a class of verbs only. They either elided the very fact that the account worked well only for a certain class (as in Bat-El's case) or they left the distinction into classes unmotivated.

In both cases, I showed how the introduction of syntactic considerations made a unified treatment possible. The phenomena do indeed differ according to the classes involved, but these classes themselves are motivated by the different syntactic character of word formation in each case. Borrowed and denominal verbs, as well as passives, are not formed directly from roots, but from other existent forms. I further argue that the formation of a word from a root constitutes a phase. At this point, a locality effect is predicted: any word X formed from a word Y no longer has access to the root from which word Y itself was formed, and instead has access only to the properties of word Y itself. Thus the various idiosyncracies associated with non-borrowed, non-denominal and non-passive verbs simply cannot arise with borrowed and denominal verbs or with passives. The verbs derived from pre-existent verbs do not have access to the root and are tied, semantically, phonologically as well as morphologically to the verb from which they are derived.

To sum up, then, the article gives rise to two conclusions. First, that dealing with phonology and morphology of verbs without taking into consideration their syntactic properties may blind us to some important generalizations. And so word-formation is best seen as, among other things, a syntactic process.

Second, and more specifically, our account of Hebrew word formation could derive the various distinctions it did not merely by making reference to syntax but, more precisely, by assuming a locality effect resulting from the process of word formation from (ultimately) roots. The two case studies therefore serve to support the reality of the consonantal root – and consequently of the binyan – as independent entities. Taken as a whole, then, I argue for a syntactic approach to Hebrew word formation, whose base is the distinction between word formation from roots and word formation from words.

NOTES

1. The following morphophonological processes are evident throughout the binyan system:

(i) *b*, *k* and *p* are spirantized in post-vocalic positions, yielding *v*, *x* and *f,* respectively — see *e.g.* (1a) vs. (1b), with *šavar* instead of **šabar*.

(ii) Gemination of the middle consonant in CiCCeC, CuCCaC and hitCaCCeC is no longer phonetically realized in Modern Hebrew. The underlying structural geminate configuration – two consonant positions – is clearly indicated by the conspicuous lack of spirantization in the patterns exemplified in (1c), (1d), (1g) – *cf. qipel* in (1c), not *qifel; moreover, those patterns alone can host quadriconsonantal roots – √trgm and *tirgem* (translate) as well as *turgam* (translate-passive), √qlql and *hitqalqel* (get spoiled). Consequently, I represent these three 'geminating' patterns as CiCCeC, CuCCaC and hitCaCCeC, respectively.

(iii) *n* assimilates to an adjacent stop: for instance, the root √npl in verbal pattern hiCCiC (make-fall) gives rise not to *hinpil but to to *hipil* (<hippil < hinpil: see point (ii) above for the reduction of hipil < hippil).

(iv) *s*, *š*, *z* and *c* undergo metathesis with prefixal *t* in the pattern *hitCaCCeC* (1g): for instance, the root √sgr in the seventh pattern yields *histager* (ensconce oneself) and not **hitsager*.

(v) Gutturals resist clustering. This can be observed in (1e), (1f), where a vowel has been inserted between the first two root consonants, with ensuing harmonization of the prefixal vowel in the case of (1e): *he*ʕ*emid* (<*hi*ʕ*emid* < *hi*ʕ*mid*), and without harmony in the case of (1f): *hu*ʕ*amad* (<*hu*ʕ*mad*).

2. It is standard to represent the Semitic verbal pattern by the 3rd person singular past. As will be mentioned below, all forms of the verb are predictable given any one single form. The choice of the 3rd person singular past is natural, as all other past forms are distinguished by it (modulo some morphophonemic complications) merely by adding some suffixes – in other words, here the suffix is zero.

3. For ease of presentation, I refer explicitly, already at this stange of the discussion, to what is traditionally assumed to be the consonantal root underlying the surface form of words such as *maxzor* (cycle) or *misxar*. This is purely a matter of presentation and should not be taken as presupposing the existence of the root in advance.

4. x, the initial consonant of the root √xšb, is the phonetic realization of the unlderlying voiceless uvular /ħ/, a guttural. This accounts for the departures from the canonical pattern forms in (7c), (7g), (7h) – for which see also point (v) in n. 1 above.

5. Note metathesis between the prefix *hit* and the first root consonant *s*: hitsager → histager.

6. In the active, the vowel melody, i/e, does not differ from that of the nominal pattern, but in the passive, the verb acquires the vowel melody u/a, typical of passives: *musgar* (was framed). The truncation of the nominal suffix – *et*, as opposed to the prefix *m-* that is carried into the verb, is yet to be explained. If the formation of verbs out of nouns involves stem modification, as argued by Bat El (1994), then perhaps *m-* is taken to be part of the stem, and therefore has to be syllabified, while – *et* is a separate affix which could be truncated by Stray Erasure. *Cf.* Bat El (ibid.) for other cases of truncated final syllables.

7. For some recent work on the syntactic nature of word formation see Halle and Marantz (1993), Marantz (1997, 2000) and Arad (2003).

8. The assumption that the first category head merging with the root defines a phase is not trivial. In Chomsky (1999) phases are defined by specific heads (C, *v*, possibly D) and have an effect on movement. I explore here the possibility that any head that creates a semantic or phonological domain defines as a phase. It is possible that the phases that are relevant for movement are those distinguished as "strong phases" (*cf.* Chomsky 1999).

9. See note 4 above for the aberrant forms in (13c), (13d), (13e).

10. Modulo selection of narrower meaning, where the borrowed word is used in a specialized sense. For example, the Hebrew word *buk*, model's portfolio, from English "book".

11. The process of *n* assimilation is not completely productive in Hebrew, and in some cases the root consonant is not assimilated, or there exist two variants, one with assimilation and one without (*linso ʃa* and *liso ʃa*, travel, from √nsʃ). What is important is that *n* that makes part of a *noun* never assimilates – see the following.

12. The epenthetic *a* in *hinciax* is a low level rule which is of no concern here.

13. Like assimilation of *n*, spirantization is not always productive, and many speakers spirantize *b*, *k* or *p* in *certain* positions where, according to "correct" grammar, they should not (*e.g. viqašti*, I asked, instead of *biqašti*, *xiseti*, I covered, instead of *kisiti*). Yet this phenomenon is rather limited, occurring mainly in initial position of the third verbal pattern, CiCCeC, but never in CaCaC (no **faxad* for *paxad*, fear) or hiCCiC (no **hisvir* for *hisbir*, explain). Most importantly, the form of word-derived verbs never changes according to spirantization rules, as illustrated in what follows.

14. For example, the root √qwm has, according to the traditional grammarians, two forms in the pattern CiCCeC: *qiyem* and *qomem*, where the first form retains the medial glide while in the second the final consonant is doubled to make up for the medial glide. (The details of the traditional grammarians'account are of course open to challenge, but the uncontested fact is the presence of two forms from what appears at least like a single root.)

15. Both metathesis and final *h* involve changes at the edge of the stem, and are therefore perhaps not related to the association of the root with the pattern, but to the actual phonological output.

16. The only exception to this in the verbal system is pattern 1, where the future masculine forms may have different vocalism for different roots, *e.g. yišmor*, *nišmor* (he/we will keep) vs *yiškav*, *niškav* (he/we will lie down).

17. This assertion is not unproblematic. Russian poses a problem for this view because it has many nouns that do not fall into any nominal inflectional class.

18. As Aronoff shows, it is not a Hebrew specific property, that lexeme-formation rules lack overt phonological manifestations. He discusses a similar case of Latin intensive verb formation.

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RÉSUMÉ

Les travaux sur les processus de formation de mots en hébreu insistent souvent sur les aspects morphologiques et phonologiques. Dans cet article, l'idée est défendue que l'information syntaxique doit être prise en considération, même pour des processus qui semblent à première vue relever exclusivement de la phonologie et de la morphologie. Cette position est soutenue dans le contexte de la discussion de deux études : le traitement des verbes dénominaux de Bat El (1994), qu'elle généralise à l'ensemble des verbes de l'hébreu ; et la discussion consacrée par Aronoff (1994) aux patrons verbaux (binyanim), dans laquelle il reconnaît un statut spécial aux formes passives. Dans le premier cas, il est montré que la syntaxe des verbes dénominaux établit clairement qu'ils sont différents des verbes dérivés directement de racines, et que leur analyse ne peut donc pas être généralisée. Dans le second cas, il est montré que le statut spécial des passifs découle directement de leur structure syntaxique, et n'a donc pas à être stipulé.

MOTS-CLÉS

Racines, binyan, formation de mots, hébreu.